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09/550,649	04/17/2000	Jarod Guertin	CNA-029	1375

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EXAMINER
KIM, DAVID S

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 12/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/550,649	Applicant(s) GUERTIN ET AL.
	Examiner David Kim	Art Unit 2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 April 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show each input signal and cascade jumper being tested by the internal performance monitor as described on page 13 of the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because of its undue length. Correction is required. See MPEP § 608.01(b).

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The disclosure is objected to because of the following informalities:

On page 3, line 17, it seems that "i o (1, N)" is used where "$i \varepsilon$ (1, N)" is intended.

Appropriate correction is required.

Claim Objections

5. **Claim 1** is objected to because of the following informalities:

In line 8 of claim 1, it seems that "N" is used where "N-1" may be intended.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There seems to be a limitation that would be difficult to implement without undue experimentation by a person of ordinary skill in the art. In line 2 of claim 4, the invention utilizes "electrical signals in the *N* optical communication channels." It is commonly known in the art that optical communication channels do not generally contain electrical signals. Additionally, The specification does not appear to address this limitation. Thus, without further disclosure or clarification, one of ordinary skill in the art would not able to practice the invention without undue experimentation.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 3** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There seems to be a contradiction between the parent claim 1 and the dependent claim 3. In line 20 of the parent claim 1, the invention comprises the step of "monitoring a signal quality for the bit error rate test signal." In claim 3, "said monitoring is independent of the bit error rate test signal." It is unclear how one of ordinary skill in the art would practice the instant inventive step of "monitoring a signal quality for the bit error rate test

signal" independently from the actual bit error rate test signal. The apparent contradiction renders the claim indefinite.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Waschka, Jr. (U.S. Patent No. 4,449,247).

Regarding claim 1, Waschka, Jr. discloses:

A method (Waschka, Jr., col. 15, line 64- col. 19, line 59) of testing a bit error rate for each of *N* (Waschka, Jr., two communication paths paired to form one set, col. 16, lines 9-30) optical communication channels having *N* (Waschka, Jr., reference oscillator 171 in Fig. 8) optical transmitters communicating to *N* optical receivers (Waschka, Jr., optical detector in col. 16, line 14) via *N* communication channels, the method comprising:

cascading (Waschka, Jr., "looped...back" in col. 19, lines 25-28) said *N* optical communication channels such that an output of an optical receiver *i* for an optical communication channel *i* is connected to an input of an optical transmitter *i+1* for an optical communication channel *i+1*, for all values of *i* from one to *N-1*;

supplying (Waschka, Jr., sequence from sequence generators 173 or 174 in Fig. 8, col. 18, lines 51-56) a bit error rate test signal from a bit error rate tester (Waschka, Jr., bit error rate test unit 22 in Fig. 8) to an input for a first optical transmitter for a first optical communication channel;

supplying (Waschka, Jr., col. 19, lines 3-12) the bit error rate test signal from an output of optical receiver *N* to the bit error rate tester;

detecting (Waschka, Jr., col. 17, lines 14-38) errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured bit error rate (Waschka, Jr., col. 19, lines 9-12); and

monitoring (Waschka, Jr., col. 19, lines 30-59) a signal quality for the bit error rate test signal at each of the *N* optical transmitters and *N* optical receivers when the measured bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the *N* optical communication channels has greater/less than a specified bit error rate value.

Although Waschka, Jr. does not expressly disclose that communication system is a wavelength division multiplexed (WDM) optical communication system, Waschka, Jr. does disclose a multiplexed system (Waschka, Jr., multiplexers 155 and 156 in Fig. 7). Additionally, WDM systems are extremely well known in the art and it would have been obvious to a person of ordinary skill in the art to implement WDM system techniques in the system of Waschka, Jr. One of ordinary skill in the art would have been motivated to do so in order to conserve fiber. That is, the system of Waschka, Jr. uses separate fiber links (Waschka, Jr., fiber optic links 17A and 17B in Fig. 1) for bi-directional communications. Using WDM techniques to send the bi-directional communications over a single fiber link would enable one to reduce the required amount of fiber by half.

Waschka, Jr. also does not expressly disclose:

comparing the measured bit error rate with a predetermined system bit error rate threshold; and

indicating that the bit error rate for each of the *N* optical communication channels is less than a specified bit error rate value when the measured bit error rate is less than or equal to the predetermined system bit error rate threshold.

However, Waschka, Jr. does disclose detecting an unacceptable system BER (Waschka, Jr., col. 19, lines 30-31). In determining the acceptability of a measured system BER, it is inherent to compare the measured system BER with a predetermined system BER threshold.

Additionally, Waschka, Jr. does disclose providing a BER indication for each of the channels when the measured system BER is unacceptable (Waschka, Jr., col. 19, lines 30-42). In the case that the measured system BER is acceptable (the measured bit error rate is less than or equal to the predetermined system bit error threshold), it would be obvious to a person of ordinary skill in the art to set the BER of each of the communication channels to be less than a specified BER, that is, the predetermined system bit error rate threshold. One of ordinary skill in the art would have been motivated to do this in order to keep the system BER less than the predetermined system bit error rate threshold. If the BER of each of the communication channels is less than the predetermined system bit error rate threshold, it is inherent that the system BER would be less than that same threshold.

Regarding claim 2, Waschka, Jr. discloses:

The method of claim 1 (see treatment of claim 1 under Waschka, Jr.), wherein said predetermined system bit error rate is equal to the specified bit error rate for each of N optical communication channels (see treatment of claim 1 under Waschka, Jr.).

11. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Waschka, Jr. as applied to claims 1 and 2 above, and further in view of Ransford et al. (U.S. Patent No. 6,351,322 B1). Waschka, Jr. discloses all the limitations of claim 4 except for said monitoring including monitoring a bit interleave parity. However, Ransford et al. teaches a method of testing a bit error rate for optical communication systems that includes monitoring a bit interleave parity

(Ransford et al., col. 5, lines 14-52). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the method of Ransford et al. in the method of Waschka, Jr. One of ordinary skill in the art would have been motivated to do this since the method of Ransford et al. would enable one to measure the Q-factor of a system. "The Q-factor is generally considered to be a more useful indicator of the accuracy of a transmission circuit" (Ransford et al., col. 1, lines 60-65). Also, the method of Ransford et al. would also enable one to measure the BER of a system in a "dramatically shorter amount of time" (Ransford et al., col. 2, line 17 – col. 3, line 5).

12. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (U.S. Patent No. 6,229,631 B1) in view of Waschka, Jr.

Regarding claim 1, Sato et al. discloses:

A method (Sato et al., col. 2, lines 40-43) of testing a bit error rate for each of *N* optical communication channels (Sato et al., optical paths between each transmitter/receiver 110, repeater 120, other successive repeaters, and the terminal transmitter/receiver along the "UPWARD" direction of optical fiber 100a in Fig. 12) in a wavelength division multiplexed (Sato et al., col. 9, lines 16-18) optical communication system having *N* optical transmitters (Sato et al., E/O converter 113 in transmitter/receiver 110, E/O converter 123b in repeater 120, and other E/O converters in successive repeaters in Fig. 12) communicating to *N* optical receivers (Sato et al., O/E converter 124a in repeater 120, other O/E converters in successive repeaters, and the O/E converter in the terminal transmitter/receiver in Fig. 12) via *N* communication channels, the method comprising:

cascading (Sato et al., note cascaded configuration of the system in Fig. 12) said *N* optical communication channels such that an output of an optical receiver *i* for an optical communication channel *i* is connected to an input of an optical transmitter *i+1* for an optical communication channel *i+1*, for all values of *i* from one to *N-1*;

supplying (Sato et al., estimation parameters in col. 6, line 19 – col. 8, line 20; col. 9, line 66 – col. 10, line 43) a bit error rate test signal from a bit error rate tester (Sato et al., workstation 130 in Fig. 12) to an input for a first optical transmitter for a first optical communication channel;

supplying (Sato et al., col. 10, lines 2-6) the bit error rate test signal from an output of optical receiver *N* to the bit error rate tester;

detecting (Sato et al., col. 8, lines 15-20) errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured bit error rate; and

monitoring (Sato et al., col. 10, lines 37-43) a signal quality for the bit error rate test signal at each of the *N* optical transmitters and *N* optical receivers when (Sato et al., note "always" in col. 10, lines 41-42) the measured bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which (Sato et al., note "control each device" in col. 10, lines 40-41) of the *N* optical communication channels has greater/less than a specified bit error rate value (Sato et al., system margin related to bit error rate in col. 6, lines 60-64).

Sato et al. does not expressly disclose:

comparing the measured bit error rate with a predetermined system bit error rate threshold; and

indicating that the bit error rate for each of the *N* optical communication channels is less than a specified bit error rate value when the measured bit error rate is less than or equal to the predetermined system bit error rate threshold.

However, Sato et al. does disclose a range of a system margin (Sato et al., col. 2, lines 41-52) related to the bit error rate (Sato et al., col. 6, lines 60-64) and adjusting the system to maintain an optimum operating condition (Sato et al., col. 10, lines 37-43). In determining the bounds of that margin, it is inherent that one bound would be a predetermined system BER

threshold. In determining the optimum operating condition, it would be inherent to compare the measured system BER with the predetermined system BER threshold.

Additionally, Waschka, Jr. discloses a method of testing a bit error rate for an optical communication system that provides a BER indication for each of the channels when the measured system BER is unacceptable (Waschka, Jr., col. 19, lines 30-42). In the case that the measured system BER is acceptable (the measured bit error rate is less than or equal to the predetermined system bit error threshold), it would be obvious to a person of ordinary skill in the art to set the BER of each of the communication channels to be less than a specified BER, that is, the predetermined system bit error rate threshold. One of ordinary skill in the art would have been motivated to do this in order to keep the system BER less than the predetermined system bit error rate threshold. If the BER of each of the communication channels is less than the predetermined system bit error rate threshold, it is inherent that the system BER would be less than that same threshold. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to include this teaching of Waschka, Jr. in the method of Sato et al. One of ordinary skill in the art would have been motivated to do this to determine the location of faults along the transmission line (Waschka, Jr., col. 19, lines 38-54).

Regarding claim 2, Sato et al. in view of Waschka, Jr. discloses:

The method of claim 1 (see treatment of claim 1 under Sato et al. in view of Waschka, Jr.), wherein said predetermined system bit error rate is equal to the specified bit error rate for each of N optical communication channels (see treatment of claim 1 under Sato et al. in view of Waschka, Jr.).

13. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Waschka, Jr. as applied to claims 1 and 2 above, and further in view of Ransford et al. Sato et al. in view of Waschka, Jr. discloses all the limitations of claim 4 except for said monitoring including monitoring a bit interleave parity. However, Ransford et al. teaches a method of

testing a bit error rate for optical communication systems that includes monitoring a bit interleave parity (Ransford et al., col. 5, lines 14-52). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the method of Ransford et al. in the method of Sato et al. in view of Waschka, Jr. One of ordinary skill in the art would have been motivated to do this since the method of Ransford et al. would enable one to measure the BER of a system in a "dramatically shorter amount of time" (Ransford et al., col. 2, line 17 – col. 3, line 5).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dulaney et al. is cited to show related methods of calculating a measured BER and comparing it with a predetermined level. Biessman et al., Takatsu, Carbone, Jr. et al., and Watanabe et al. are cited to show related methods of testing a BER in an optical communication system with cascaded channels. Takatsu and Carbone, Jr. et al. are also cited to show related methods of monitoring a signal quality for a BER test signal. Davis et al. is cited to show related methods of testing a BER in a wavelength division multiplexed optical communication system.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Kim whose telephone number is 703-305-6457. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

DSK
December 24, 2002

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